





GLOBAL SECURITY & STABILITY NUCLEAR NAVAL PROPULSION

EMERGING CHALLENGES

WORLD-CLASS SCIENCE, TECHNOLOGY & ENGINEERING ADAPTIVE
WORKFORCE &
RESILIENT
INFRASTRUCTURE

INTEGRATED ENTERPRISE MANAGEMENT & OPERATIONS



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DEFENSE PROGRAMS

Completed Annual Assessment Cycle 26: The three NNSA Laboratory Directors certified that the stockpile remains safe, secure, and effective, and that underground nuclear explosive testing is not required at this time. 1

SAVANNAH RIVER SITE

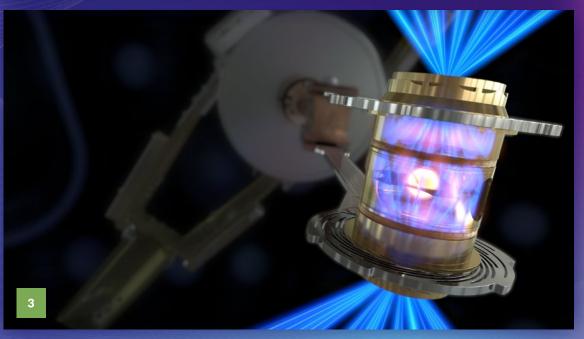
Achieved CD-3A for dismantlement and removal of existing equipment in the future Savannah River Plutonium Processing Facility. Continued collaboration with Los Alamos National Laboratory to establish NNSA's ability to produce at least 80 plutonium pits per year as close to 2030 as possible. 2

LAWRENCE LIVERMORE NATIONAL LABORATORY

The National Ignition Facility achieved fusion ignition on Monday, December 5, 2022 - a major scientific breakthrough decades in the making that will pave the way for advancements in understanding weapon physics and highlights the promise of clean fusion power.







LOS ALAMOS NATIONAL LABORATORY

The Pit Technologies (PT) division built seven pits, the most built at the laboratory since 2009. These development pits were the best in the program to date thanks to improvements in characterization methods, the introduction of residual gas analysis, upgraded gas sampling equipment, improved welding parameters, and rapid modification of non-nuclear hardware. PT also completed 61 electrorefining runs, the highest since 1990. The Foundry group produced castings at a rate not seen in more than 10 years, resulting in 33 shape castings supporting multiple programs. All required engineering evaluations for chemistry and radiography processes supporting the first production unit are complete, with an additional 19 evaluations conducted and in the closeout phase.

SANDIA NATIONAL LABORATORIES

The W88 ALT 370 entered early production and had multiple units delivered to the Department of Defense (DoD), achieving acceptance by the DoD as a Full Stockpile Item. The updated W88, which can be launched on missiles from Ohio-class submarines, will replace older W88 warheads in the stockpile. 5

SANDIA NATIONAL LABORATORIES

Qualified the B61-12, underpinning its early production and the delivery of multiple units to the Department of Defense (DoD), as well as acceptance by the DoD as a Full Stockpile Item. Sandia complemented this achievement by certifying compatibility with the F-35A, as well as the F-15E, B-2A, PA-200, F-16 C/D, and F-16 MLU.







SANDIA NATIONAL LABORATORIES

Provided W80-4 hardware for integration with the U.S. Air Force's Long Range Standoff weapon and completed two powered flight tests, collecting critical data to support design and qualification.

LOS ALAMOS NATIONAL LABORATORY

Installed a robotic arm in a glovebox, which will enable the pit mission programs to use automation for plutonium processing for the first time and completed the management self-assessment for the chlorine system - this effort will reduce waste and improve plutonium metal quality.

DEFENSE PROGRAMS

W93: Completed Phase 1 Concept Study and received Nuclear Weapons Council authorization to advance to Phase 2 Feasibility Study and Design Options. The W93 will hedge against technical risk in the fielded warheads and over-reliance on the W76, allowing the U.S. to keep pace with future threats. The W93 Program is vital for continuing our longstanding support to the United Kingdom, which is also modernizing its nuclear forces with the Replacement Warhead.





LAWRENCE LIVERMORE NATIONAL LABORATORY

Completed the Exascale Computing Facility
Modernization project, which upgraded a building
in Lawrence Livermore National Laboratory to
support El Capitan and other next-generation
supercomputers capable of performing the
high-fidelity modeling and simulation necessary
to meet the needs of NNSA's Stockpile
Stewardship Program.

DEFENSE PROGRAMS

Achieved 100% safe and secure transport of nuclear materials and weapons. All shipments completed without compromise or loss of nuclear weapons or components, or release of radioactive material.

SAVANNAH RIVER SITE

Oversaw the performance of three major openglovebox maintenance outages to modernize Tritium facility infrastructure for future mission objectives, as well as the completion of two Tritium extractions. ¹⁰





LAWRENCE LIVERMORE NATIONAL LABORATORY

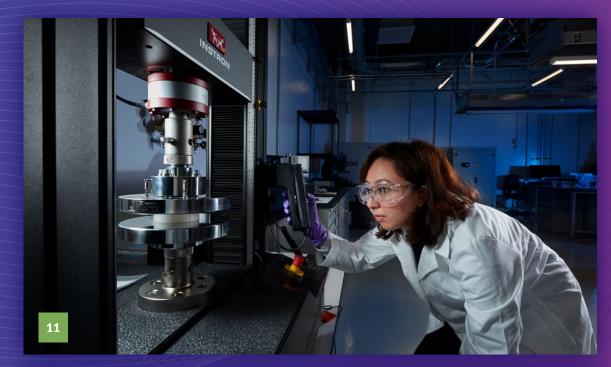
Polymer Enclave successfully began part production at scale in support of the modernization programs. 11

NNSA PRODUCTION OFFICE

Completed the B61-12 First Production Unit and achieved full-rate production for the B61-12 and the W88 Alt 370. 12

COST ESTIMATING AND PROGRAM EVALUATION

Conducted independent cost estimates on the W87-1 Modernization Program to support its entry into Phase 6.3 and the W80-4 Life Extension Program to support its entry into Phase 6.4.











DEFENSE NUCLEAR NONPROLIFERATION

Provided urgent equipment, supplies, and technical assistance to Ukraine to protect nuclear power plants, secure radioactive materials, improve response capacities, and detect/interdict smuggling of nuclear and radioactive materials. The Office of Global Material Security's (GMS's) long-standing partnerships with Ukrainian partner agencies, as well as a network of in-country contractors and existing contract mechanisms, has allowed GMS to assist with the delivery of border security equipment for use on the Russian, Moldovan, Belarussian, and Poland borders.

NNSA PRODUCTION OFFICE

Completed the removal and shipment of highly enriched uranium (HEU) from Japan to the U.S., wrapping up a four year effort to repatriate more than 30 kg of U.S.-origin HEU from multiple Japanese research reactors.

NEVADA NATIONAL SECURITY SITE

Supported emerging international events, including more than 200 consecutive days of real-time expert technical support and multiple personnel deployments to assess international nuclear security issues. Developed and deployed a High-Impact Sensor, pioneering short lead-time solutions with rapid prototyping and deploying cutting-edge telemetry and sensor solutions. This solution placed NNSA at the center of data collection and evaluation to answer global security questions abroad.



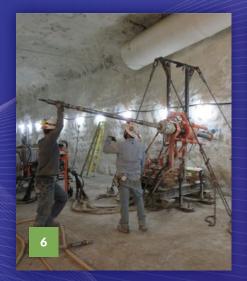


COUNTERTERRORISM & COUNTERPROLIFERATION

The Nuclear Emergency Support Team (NEST) continuously monitored data from radiation detection sensors in Ukraine and the surrounding region to ensure real-time situational awareness of the status of Ukraine's nuclear facilities. NEST also deployed nuclear detonation detection systems to the region to deter nuclear weapons use, attribute attacks, and provide early warning for public health and safety. Additionally, NEST provided training to Ukrainian responders on emergency preparedness and response, nuclear forensics, atmospheric modeling, and public communications concerning nuclear emergencies, increasing Ukraine's resilience against a wide range of scenarios.

LOS ALAMOS NATIONAL LABORATORY

- Supported the U.S. Nuclear Detonation
 Detection System as a key provider of space-sensing payloads and ground systems. Concluded extensive on-orbit testing of the Space and Atmospheric Burst Reporting System and the SENSER payloads hosted on the Department of Defense STPSat-6.
- Initiated the on-orbit technology demonstration experiment phase of the SENSER project.
- Supported ongoing payload modernization efforts, including flight qualification testing of the Hard Radiation Sensor subsystem of the GPS-hosted modernized Global Burst Detector payloads.







NEVADA NATIONAL SECURITY SITE

Began one of the largest excavations ever undertaken at the Nevada National Security Site while actively mitigating mining challenges as they arose. The impact of work completed in FY22 included: studying the geotechnical and ventilation aspects of the planned underground space to confirm site safety and feasibility conditions; conducting core drilling activities that will be used to refine the geologic model; and configuration and design activities to ensure the planned underground space will support nonproliferation mission requirements in the coming years.

COUNTERTERRORISM & COUNTERPROLIFERATION

Participated in Cobalt Magnet 2022, the latest in a series of full-scale exercises with federal, state, and local stakeholders, testing concepts of operations and methods for assessing, interpreting, and communicating the impacts of a release of radioactive material.

DEFENSE NUCLEAR NONPROLIFERATION

Removed 101 cesium blood and research irradiators from U.S. facilities, 93 of which were replaced by radioactive source-free alternative technologies - the largest number of recoveries completed in a year.





DEFENSE NUCLEAR NONPROLIFERATION

Removed more than 55 kilograms of weaponsusable nuclear material from partner countries in Asia, Europe, and North America, achieving permanent threat reduction.

COUNTERTERRORISM & COUNTERPROLIFERATION

Assumed the role of vice chair of the Nuclear Forensics Executive Council, advancing the agency's role in leading nuclear forensics. Led interagency coordination and implementation of the Nuclear Forensics and Attribution Strategic Plan (FY22-26), establishing milestones and requirements to shorten timelines for nuclear forensics results to support Presidential decision-making in a crisis.

DEFENSE NUCLEAR NONPROLIFERATION

Executed the first full-scale, overseas deployment of the Mobile Uranium Facility and Mobile Plutonium Facility. This was the largest and most complex overseas exercise the Mobile Packaging team conducted. The program uses these exercises to refine its deployable characterization, stabilization, and nuclear material packaging capabilities. 10

Naval Nuclear Propulsion

NAVAL REACTORS

Provided fleet support for 31 months of deployment across the aircraft carrier fleet and supported aircraft carriers in construction, including JOHN F. KENNEDY (CVN 79), ENTERPRISE (CVN 80), and DORIS MILLER (CVN 81).

NAVAL REACTORS

Supported construction efforts on 16 VIRGINIA class submarines, christening of the USS NEW JERSEY (SSN 796) in November 2021, and delivery of the USS OREGON (SSN 793), commissioned in May 2022, and USS MONTANA (SSN 794), commissioned in June 2022.

NAVAL REACTORS

On the S8G Prototype Refueling Overhaul project, completed restoration and reassembly of the new design reactor head area, installation and initial energization of a unique Type II Instrumentation and Control system, and testing of new processed cooling water system towers to support the continuation of the land based prototype reactor for an additional 20 years of testing and training.









Emerging Challenges

NNSA PRODUCTION OFFICE

Provided 60% of Pantex plant electrical power, transferring 32,200 Renewable Energy Credits to Y-12 from the operation of the Pantex windfarm.

LOS ALAMOS NATIONAL LABORATORY

Led the Intermountain West Energy Sustainability and Transitions initiative, which is focused on partnering with communities to develop an energy transition roadmap for six intermountain west states: AZ, NM, CO, UT, WY, and MT. Partnered with regional colleges, universities, and other entities to develop a roadmap to carbon neutrality and to build regional coalitions for implementation.

ENVIRONMENT, SAFETY, AND HEALTH

Established the NNSA Carbon Pollution-Free Electricity (CFE) Implementation Plan to identify strategies and solutions to lead the way in reducing reliance on fossil fuels and transitioning to 100% CFE on a net annual basis by 2030, including 50% 24/7 CFE.

DEFENSE NUCLEAR NONPROLIFERATION

The Southwest Research Institute conducted an independent assessment of NNSA's Bioassurance Program and found it will, by including a global and national security perspective, provide unique and critical capabilities that anticipate and mitigate risks due to rapidly advancing biotechnology and biothreats.

World-Class Science, Technology & Engineering

SANDIA NATIONAL LABORATORIES

Recognized by R&D World Magazine with an award for USTEAMS, a technique to synthesize composite coatings using silica and sugarderived carbon, mimicking natural seashell laminate structures. These coatings exhibit high thermal stability up to 1650°C. This creates a wide range of applications in mechanical and thermal protections.

LOS ALAMOS NATIONAL LABORATORY

Partnered with NASA on world-class projects such as:

- Instruments for the Interstellar Mapping and Acceleration Probe (IMAP) mission, IMAP-Hi, and the Solar Wind Electrons instrument
- Science operations of the ChemCam,
 SuperCam, and SHERLOC instruments on Mars
- The Nano-satellite Atmospheric Chemistry Hyperspectral Observation System (NACHOS) project, which successfully deployed two CubeSats

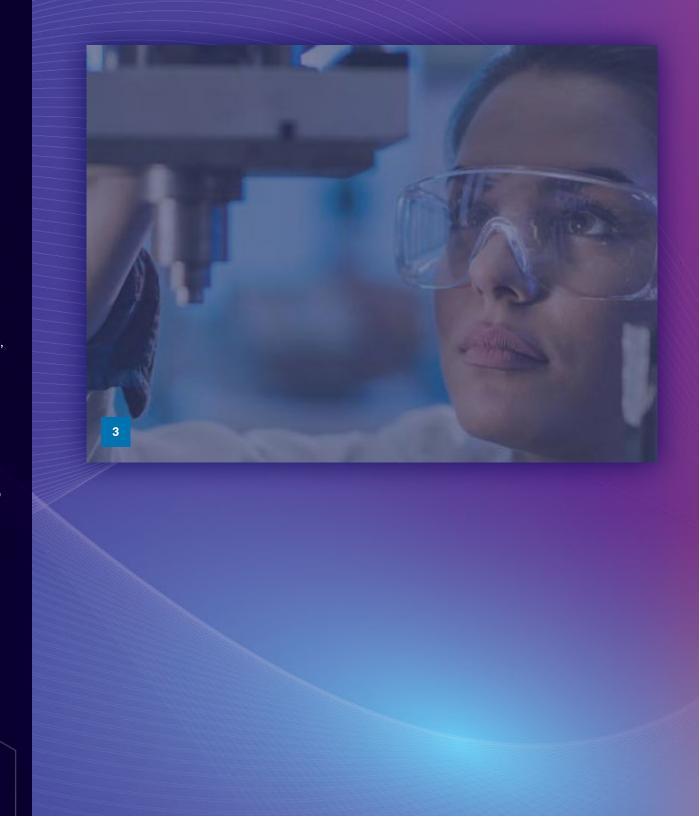




World-Class Science, Technology & Engineering

KANSAS CITY NATIONAL SECURITY CAMPUS

- Deployed numerous Additive Manufacturing (AM) and Direct Ink Write (DIW) solutions to help accelerate product development
- Printed AM connectors for proof-of-concept and test equipment, reducing over eight months of lead time per part printed
- Set up 5-axis DIW printer at Los Alamos National Laboratory identical to systems operating at Kansas City National Security Campus, Lawrence Livermore, and Sandia National Laboratories to increase collaboration efforts
- Fabricated a conformal sensor array using DIW silicone that detects compressions in discrete areas with high fidelity
- Deployed DIW selective laser tooling, saving \$50K and reducing flow time in excess of 50 days
- Hosted the sixth annual AM Joint Operations Group onsite with 70+ participants







INFRASTRUCTURE

Completed the 66,000 square foot Uranium Processing Facility's (UPF) Mechanical Electrical Building (MEB), which will provide utilities for the Salvage and Accountability Building and the Main Process Building of UPF. The MEB is a standalone, non-nuclear facility housing mechanical, electrical, heating, ventilation, air conditioning, utility equipment, and support systems.

DEFENSE NUCLEAR SECURITY

Implemented Trusted Workforce 1.5 to reduce periodic reinvestigations and provide near real-time information on clearance holders. Submitted more than 40,000 fingerprint requests and enrolled more than 91,000 of DOE's clearance holders into an FBI database that identifies law enforcement activity of clearance holders.

POLICY AND STRATEGIC PLANNING

Hosted five Administrator's Strategy Forums, drawing hundreds of participants. Distinguished guest speakers included Under Secretary of State Bonnie Jenkins, Ambassador Laura Holgate, NSC Senior Director for Emerging Technology Tarun Chhabra, DTRA Director Rebecca Hersman, and best-selling author/strategist PW Singer.







INFORMATION MANAGEMENT

Consolidated restricted data networks in preparation for the future network modernization efforts.

COUNTERTERRORISM & COUNTERPROLIFERATION

Developed and deployed 64 innovative trainings and exercises for more than 3,800 participants focused on emergency preparedness and response using the best adult-learning techniques, multimedia tools, and cross-disciplinary approaches. 3

DEFENSE NUCLEAR SECURITY

Achieved full operating capability of the Portable Intrusion Detection System (PIDS) at the Y-12 National Security Complex. PIDS is a rapidly deployable mobile detection and alarm system designed in collaboration with the Department of Defense. The system is expected to prevent operational interruptions while saving tens of millions of dollars over its lifecycle.

MANAGEMENT & BUDGET

Made 357 external hires, achieving 1,895 employees onboard as of close of FY22. 5







MANAGEMENT & BUDGET

Minority Serving Institutions (MSIs) Partnership Program funded 30 consortia consisting of 52 MSIs: 19 Historically Black Colleges and Universities, 21 Hispanic Serving Institutions, and 12 Tribal Colleges and Universities, as well as 13 nuclear security enterprise sites.

EMERGENCY OPERATIONS

Led DOE/NNSA participation in Eagle Horizon - a mandatory annual exercise for all executive branch departments and agencies that tests U.S. National Essential Function resilience by exercising continuity plans, procedures, and capabilities. 7

DEFENSE NUCLEAR SECURITY

Established a state-of-the-art technical security testing and training facility to deliver new technical security countermeasures and detection techniques to safeguard sensitive NNSA areas throughout the nuclear security enterprise while enabling emerging technologies.

LAWRENCE LIVERMORE NATIONAL LABORATORY

Completed construction of the Emergency
Operations Center (EOC), which enables Lawrence
Livermore National Laboratory to respond to
operational and energy emergencies and provide
emergency assistance. The new EOC achieved a U.S.
Green Building Council Leadership in Energy and
Environmental Design certification in 2022.









INFORMATION MANAGEMENT

Deployed collaboration tools and upgraded conference rooms at NNSA headquarters to encourage connections across the enterprise and support the hybrid workforce.

KANSAS CITY NATIONAL SECURITY CAMPUS

Hired a record 1,430 external employees with an additional 200+ individuals in the hiring pipeline, significantly more than the past three years. Kansas City National Security Campus deployed teams to more than 100 recruiting events, conferences, and universities. 10

INFRASTRUCTURE

Completed the TA-3 Substation project at Los Alamos National Laboratory to replace the aging substation and meet the laboratory's increasing power demands. 11

NEVADA NATIONAL SECURITY SITE

Completed the first formal phase of the U1A Complex Enhancement Project (UCEP) by achieving CD-4 on UCEP 10. Nevada National Security Site also began work on the second formal phase after achieving CD-2/3 on UCEP 20. A \$50 million construction project, UCEP 10 came in \$3 million under budget and one year ahead of schedule. UCEP 20 will install the infrastructure that will support the expansion of underground subcritical experiments at U1a. 12





glassdoor BEST PLACES TO WORK





Adaptive Workforce & Resilient Infrastructure

SANDIA FIELD OFFICE

Celebrated the completion of the NNSA John A. Gordon Albuquerque Complex. The structure houses approximately 1,200 employees who support NNSA's vital national security missions. 13

INFRASTRUCTURE

Completed the purchase of an existing industrial facility to serve as the new location for Y-12 development operations and mission work that is currently conducted in 1940s-era facilities, providing a modern environment for developing new technologies and supporting the global security mission. 14

LAWRENCE LIVERMORE NATIONAL LABORATORY

Ranked in the top 100 "Best Places to Work: U.S. Large" category and was named the No. 2 government/government contractor employer by an independent group for the fourth year in a row. 15

INFORMATION MANAGEMENT

Developed and deployed a Section 508 program across NNSA to ensure that information and communication technology is accessible to, and usable by, individuals with disabilities.

COUNTERTERRORISM & COUNTERPROLIFERATION

Authorized professional development rotations for federal and contractor staff to provide Ukrainespecific surge support.





ENVIRONMENT, SAFETY, AND HEALTH

Initiated project activities to expand photovoltaics on the John A. Gordon Albuquerque Complex roof, which puts the building on the path to Leadership in Energy and Environmental Design Platinum—a first for NNSA. 16

MANAGEMENT & BUDGET

Provided the Office of Defense Programs with 103 seats and two classified video teleconference rooms in ~10,000 square feet of renovated space in Forrestal. Renovated a suite in the Forrestal West Building, which will provide staff with more modern, ergonomic equipment and furniture, as well as upgraded HVAC and other infrastructure to provide a safer, healthier work environment. Initiated the use of space management software for reserving newly established hotel space in Germantown and Forrestal which will also be implemented in the new Albuquerque building and the field offices. 17

POLICY AND STRATEGIC PLANNING

Executed a two-day Laboratory, Plant, and Site (LPS) Strategic Planning Summit where senior leadership from across the enterprise developed a shared understanding of how the LPS supports NNSA's mission priorities and identified crosscutting challenges and opportunities to strengthen enterprise-wide integration and coordination.

GENERAL COUNSEL

Helped to chart the path from the Pantex/Y-12 contract award protest to separate competitions for Pantex and Y-12. 2

PARTNERSHIP & ACQUISITION SERVICES

New Instruments Awarded: Successfully awarded 246 New Contract and Financial Assistance actions valued over \$24.06B (inclusive of all option periods).

Obligations: Other than M&O Contracting, obligated over ~\$1.7B in 2,141 actions. M&O Contracting obligated over ~\$17.95B in 206 actions.

The award of the new Acquisition Management Information System task order that will move NNSA forward in modernizing the acquisition process in FY23.

COST ESTIMATING & PROGRAM EVALUATION

Provided a forecast of the total funding required over the five-year Future Years Nuclear Security Program by integrating forecasted escalation factors into the five-year funding plan.





EMERGENCY OPERATIONS

Published the FY21 Annual Report, providing a comprehensive overview of the health of the department's emergency management system. 3

ENVIRONMENT, SAFETY, AND HEALTH

In cooperation with the Field Offices, improved effectiveness and consistency in the use of safety performance objectives, measures, and commitments in applying quantitative safety measures into performance evaluation reports. This approach has upgraded the consistency and quality of performance measures across the enterprise.

COST ESTIMATING & PROGRAM EVALUATION

Developed the cost-estimating database VEGA, which integrates NNSA costs, as well as programmatic and technical data on weapons modernization programs and capital asset projects to improve the accuracy and credibility of cost estimates across the nuclear security enterprise.

POLICY AND STRATEGIC PLANNING

Delivered the 2022 NNSA Strategic Vision that reiterated enduring mission priorities (MPs) and established a new MP related to leveraging NNSA's skills and technologies to address emerging challenges.









CONTROLLE

U.S. DEPARTMENT OF ENERGY

ANNUAL REPORT

FOR FISCAL YEAR 2021 ON THE STATUS OF THE DEPARTMENT'S EMERGENCY MANAGEMENT SYSTEM

PREPARED BY THE OFFICE OF EMERGENCY OPERATIONS (NA-40)

NATIONAL NUCLEAR SECURITY ADMINISTRATION

⑥ N√SA

STRATEGIC VISION

Innovate. Collaborate. Deliver.

FROM THE NNSA LEADERSHIP TEAM



A. Hruby Frank /
or Secretary of Energy Principal Admin's Admin's Admin's Admin's Principal Admin's Ad

It is our Admin NNSA! Nation the NN and six we pro

we provide comprehensive nuclear security solutions that protect the Aministran poole, our allies, and our patheres in a dynamic world. The geopolitical environment is shifting, science and technology capabilities are advancing at an accelerated pace, and threats continue to evolve. This leads to increasing uncertainty about the future but also

the rucure and play an indepensable role in provising solutions to the range of national security challenges our Nation faces. SE is to deliver on the NNSA mission, consistent with the vision in this document. We are most together to address nuclear socurity challenges, and it is the foundation of our success

NNSA is the one place in government venier the complementary missions of insulter deterrence, aims control, and nonepositieration come together to merci con institute predest. This unique mession integration is NISAS Screegic, Advantage, and it is enabled by unperalled science, technology, and eignineering STASI, population, an univased weekforce, an innovinté spoit, and a committement to delivering on our mission as efficiently and federiche; also solities. We will nut-ture and draw on that advantage to oring our science, products, and infrastructure to the next level of maturi and make the verifical safety place.

2 | 2022 STRATEGIC VISION

OUR VISION

To anticipate tomorrow's nuclear and national security challenges and deliver timely, innovative solution

environment that brings new challenges to our mission and to our Nation's security. The successful instituty and current strength and diversity of our enterprise allows to bring broad knowledge, experience, and expertise to these challenges. Our fundamental mission is enduring but dynamic, and our vision guides ou as we might men and our strength of the successful control of the

or their performance of the control of the control

Innovate. Collaborate. Deliver

le innovate to create new solutions and approaches to a suite of national security challeng. We collaborate with a range of partners to maximize impact and bolister mission success, le deliver our unique products and infrastructure to address an evolving threat environmen

3 | 2022 STRATEGIC VISION



EMERGENCY OPERATIONS

Published DOE Continuity Programs order to instruct the entire DOE HQ and field complex on each office's responsibilities within their respective Continuity of Operations plans. 5

PARTNERSHIP & ACQUISITION SERVICES

Developed new Compensation Increase Plan guidance to address workforce and retention issues. The team recommended and implemented changes to accurately capture Benefits Value and Benefits Cost impacts on current employees.

KANSAS CITY NATIONAL SECURITY CAMPUS

Supply Chain Management Center (SCMC) exceeded its FY22 savings goal (\$288 million) with a validated total savings of \$388 million. SCMC supported small businesses at an enterprise level with 58% of dollars awarded to small businesses in response to the DOE's 50% target. Historically underrepresented business zone (HUBZone) small businesses received 11% of dollars against DOE's 3% target. Additionally, 7% of dollars were awarded to small and disadvantaged veteran-owned small businesses, exceeding DOE's 3% target.

PARTNERSHIP & ACQUISITION SERVICES

Implemented changes and improvements to the NNSA CPEP/PEMP process, strategically aligning key outcomes, goals, and objectives for more clarity in award fee plans critical to the NNSA mission.





LOS ALAMOS NATIONAL LABORATORY

Secretary Granholm vacated the 1954 Atomic
Energy Commission Decision that revoked the late
Dr. J. Robert Oppenheimer's security clearance after
Los Alamos Laboratory Director, Thom Mason, and
eight former directors signed a letter suggesting a
nullification of the decree as an "historicall appropriate
remedy" to the unjust ruling.

